



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,007	07/10/2003	Yonglin Huang	15436.251.2.1	3075
22913	7590	09/20/2005	EXAMINER	
WORKMAN NYDEGGER (F/K/A WORKMAN NYDEGGER & SEELEY) 60 EAST SOUTH TEMPLE 1000 EAGLE GATE TOWER SALT LAKE CITY, UT 84111			PAK, SUNG H	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

<b>Office Action Summary</b>	<b>Application No.</b> 10/617,007	<b>Applicant(s)</b> HUANG ET AL.	
	<b>Examiner</b> Sung H. Pak	<b>Art Unit</b> 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2005.  
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-10, 15-27 is/are rejected.  
 7) ☒ Claim(s) 11-14 is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

Applicants' amendment filed 7/08/2005 has been entered. All pending claims and the arguments for patentability have been carefully studied by the examiner. Upon further reconsideration, however, the claim rejection provided in the previous office action is maintained by the examiner and the office action is made final. Please refer to Response to Arguments for details.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 6, 9, 10, 23-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Kinoshita (US 2002/0008901 A1) as discussed in the previous office action.

Kinoshita discloses an optical device with all the limitations set forth in the claims, including: a pump module for optical amplification of a light signal on a fiber-optic cable in a fiber-optic network, the pump module comprising an active component part comprising at least a first laser diode ('142A', Fig. 42) and a second laser diode ('142B', Fig. 42) disposed on a substrate ('142' Fig. 42); wherein the first laser diode output a first pumping beam and the

Art Unit: 2874

second laser diode outputs a second pumping beam (Fig. 42); combiner components optically coupled to the active component part ('142C + 143 + 144-2') comprising a first and second wedge (Fig. 54a, 'Birefringent prism A & B'); a faraday rotator optically coupled to first and second wedge (paragraph 282); wherein the combiner isolates the first and second laser diode from back reflections ('144-2' Fig. 42); wherein the active part comprises discrete laser diodes bonded to the substrate (Fig. 42, '142A', '142B'); wherein the first and second laser diodes output linearly polarized beams that are perpendicular to each other (paragraph 0468-0469); wherein the laser diodes may be coupled the combiner through polarization maintaining fibers (Fig. 44, paragraph 0486-0496).

Claims 16-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukushima (US 5,402,509) as discussed in the previous office action.

Fukushima discloses an optical device with all the limitations set forth in the claims, including: a combiner for use in combining a first pumping beam with a second pumping beam traveling in a forward direction (Fig. 4, Fig. 6c); a first birefringent wedge that receives a first pumping beam and a second pumping beam ('32' Fig. 4, Fig. 6c; column 5 lines 15-16, column 3 lines 31-34); wherein a state of polarization of the first pumping beam is substantially perpendicular to the state of polarization of the second pumping beam (column 6 lines 4-6); a rotator that rotates the first pumping beam and the second pumping beam (column 5 lines 36-38), wherein a return optical beam traveling in a backward direction through the combiner is rotated by the rotator such that a source of the first pumping beam and a source of the second beam are substantially isolated from the return optical beam (Fig. 7); a second birefringent wedge that

Art Unit: 2874

combines the first pumping beam and the second pumping beam received from the rotator into an output beam (Fig. 6c); a first lens that focuses the first pumping beam and the second pumping beam into the first birefringent wedge ('7' Fig. 6c); a second lens that focuses the output beam ('3' Fig. 6c); a first polarization maintaining fiber that is connected with a source of the first pumping beam ('33' Fig. 6c); a second polarization maintaining fiber that is connected with a source of the second pumping beam ('34' Fig. 6c); wherein the polarization axis of the first polarization maintaining fiber is substantially perpendicular to the axis of the second polarization maintaining fiber (column 6 lines 4-6); a non-latching magnetic material used as a rotator, controlling the polarization so that stray magnetic fields do not influence the polarization of the transmitted light (column 3 lines 34-43); wherein the first and second pump beams may be generated by first and second laser diodes (column 11 lines 20-23).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 4, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita (US 2002/0008901 A1) in view of Bischel et al (US 2002/0110328 A1) as discussed in the previous office action.

Art Unit: 2874

Kinoshita discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the use of laser diodes monolithically formed on a substrate, having photodiodes configured to monitor the output power of the diodes.

Bischel, on the other hand, explicitly teaches a laser pump module having monolithically formed laser diodes with plurality of monitoring diodes (Fig. 10, paragraph 0124). This configuration is considered advantageous and desirable in the art because it allows for simplified connection arrangement between controller/modulator devices and the laser diodes, and allows for modularization of the pump light source, which simplifies the access to and/or replacement of the pump light source. Additionally, having a monitoring diode is considered advantageous and desirable in the art because it allows for accurate and precise generation of pumping light which prevents undesirable power fluctuation in the optical output. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Kinoshita device to have monolithically formed laser diodes with monitoring diodes configured to monitor the output power of the laser diodes.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita (US 2002/0008901 A1) as discussed in the previous office action.

Kinoshita discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the active part coupled to the combiner through free space or through a fiber-optic pigtail. However, the use of free space or a fiber optic pigtail for coupling optical components is well known in the art. Free space coupling is considered advantageous and desirable in the art because it allows for modularization of active

Art Unit: 2874

part relative to the combiner, which simplifies access to and/or replacement of active part. The use of a fiber-optic pigtail is considered advantageous and desirable in the art because it allows for accurate and precise placement of optical input/output ports for optimal coupling efficiency. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Kinoshita device to have active part coupled to the combiner through free space or through a fiber-optic pigtail.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita (US 2002/0008901 A1) in view of Souda et al (US 5,493,440) as discussed in the previous office action.

Kinoshita discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the use of wave plates for linearly polarizing first and second beams, so that the first and second beams assume substantially perpendicular polarization.

On the other hand, Souda explicitly teaches the use of wave plates for rotating the polarizations of the transmitted light such that light beams emitted from first and second input fibers assume substantially perpendicular polarization states (abstract). The use of wave plates is considered advantageous and desirable in the art because they provide low-cost and reliable means for changing the polarization of transmitted optical beams. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Kinoshita device to have wave plates.

***Allowable Subject Matter***

Claims 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Huang et al (US 5,493,440) no longer qualifies as a prior art under 35 USC 102(e). Therefore, none of the prior art fairly teaches, inter alia, a pump module having a combiner with Faraday rotator comprising a non-latching magnetic material as claimed in the instant application.

***Response to Arguments***

**Rejections under 35 USC 102:**

Starting on page 12 of the applicants' response, it is argued that Kinoshita reference does not teach a combiner that isolates the first laser diode and the second diode from back reflections. Specifically, it is argued that it is the separate isolator element in Kinoshita that isolates the diodes from back reflections.

The examiner respectfully submits that the "combiner" disclosed by Kinoshita is really a combination of individual elements that work together to 'combine' the light beam and provide output. As such, the 'isolator' element to which applicants refer, is the part of the elements that make up the 'combiner' in Kinoshita. (Please also refer to the 35 USC 102 rejection provided in the previous office action, as well as that maintained in this office action).

Even in the present application, the "combiner" is not a single, non-divisible element. Fig. 5 and claim 10 of the present application discloses that the "combiner" of the present



Art Unit: 2874

invention is also made up of separate individual elements that work together to perform a “combiner” function. Specifically, the combiner of the present application is composed of a first wedge, faraday rotator, and a second wedge with each element performing specific optical manipulations that are distinct from each other.

Thus, the examiner respectfully submits that the ‘combiner’ of Kinoshita fully anticipates the combiner limitations of the present application and the rejection is proper.

Further, starting on page 14, it is argued that Fukushima reference does not teach a second birefringent wedge that combines the first and second pumping beams as claimed. Specifically, it is argued that the lens element of Fukushima is the one that combines the pumping beams.

The examiner respectfully submits that the lens element to which the applicants refer, is merely used for focusing the beams into the output fiber, and that the second birefringent element of Fukushima does refract the optical beams so that the beams would converge. Without the lens element the position of the output fiber would probably need to be changed in order to efficiently out-couple the light beam, nevertheless, the second birefringent element does perform the combining function as claimed in the instant application. Specifically, Fukushima states, “The beams 125 and 126 undergo refraction as extraordinary ray and ordinary ray, respectively, in the wedge plate 31 and become beams 127 and 128. Since the histories of refraction which the beams 127 and 128 have undergone are equal to the histories of refraction which the beams 117 and 116 underwent in Fig. 6B...” (emphasis added). Therefore, the examiner respectfully submits that the second birefringent plate refracts the light beams to

Art Unit: 2874

converging beams, regardless of the fact that lens element is used to specifically focus the beams into the output fiber. For this reason, the claim rejection is proper.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak  
Patent Examiner  
Art Unit 2874

sp